Barun ICT

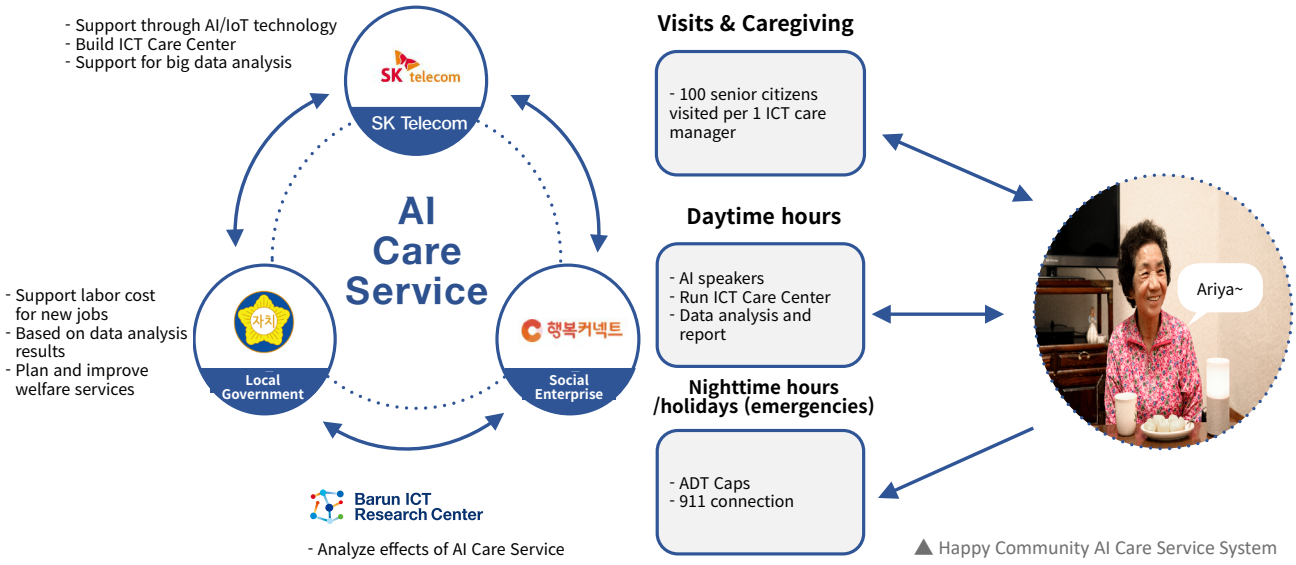
2020.6
June ENG
newsletter

Barun ICT Research Center conducts research on various ICT issues to explore socially desirable solutions.
Barun ICT Research Center aims to contribute to healthy and ethical ICT society.

BARUN ICT Events

AI Care Service: A Small Happiness for Older Adults Living Alone
SK Telecom & Barun ICT Research Center, Untact Press Conference, Held on May 20

Barun ICT Research Center of Yonsei University announced the results of analyzing performance and usage effects of AI Care Service during its first anniversary event. Taking the Covid-19 situation into consideration, the press conference was broadcast live on YouTube and received significant media attention. According to data analysis by Barun ICT Research Center, over 95% of older adults use AI speakers more than 3 times a week, and it has been shown to greatly help their emotional needs - happiness increased while loneliness decreased. In addition, the enjoyment from using digital devices improved, and the fear of using them decreased. In particular, the self-efficacy in using digital devices has been improved.



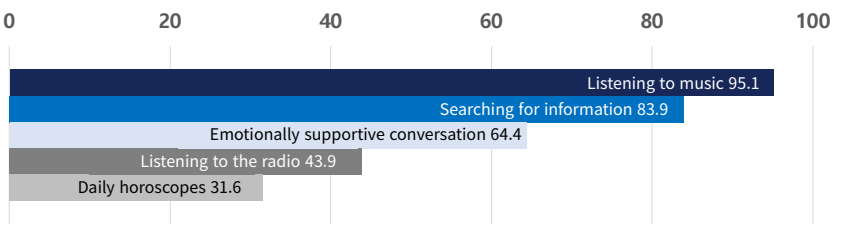
▲ Happy Community AI Care Service System

What is AI Care Service?

AI Care Service refers to a service that installs AI speakers, the NUGU Candle, and wireless communication devices in the houses of the older adults living alone. After installation, an ICT Care manager visits the house and teaches them how to use it. The Center then checks on their safety by looking at usage patterns: when negative phrases such as “I am lonely,” or “I am depressed” are detected, the older adults are connected to a therapist. Furthermore, in case of emergencies, the AI speaker NUGU quickly sends an SOS signal to the ICT Care Center or ADT Caps, providing a comprehensive care service.

Main Usage of AI Speaker (NUGU)

More than 95% of the 670 older adults surveyed responded that they use AI speakers more than 3 times a week. 95.1% used music listening services, and 83.9% said they search for information such as the weather and news. The AI speaker shares emotions and can have supportive conversations - 64.4% of respondents use the function. These results contributed to bridging the access gap by providing digital infrastructure as well as between competency and utilization through education via the ICT Care managers.



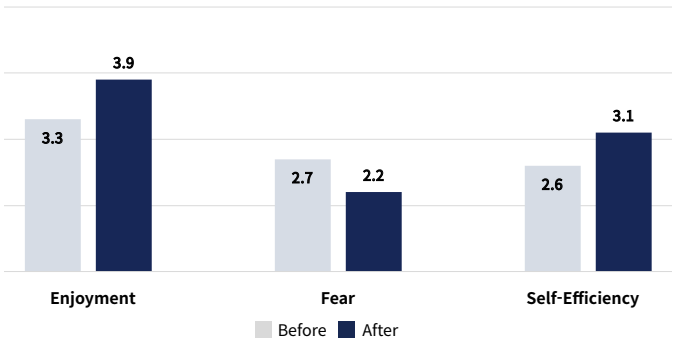
▲ Function of NUGU Candle (multiple responses)

AI Care Service, A Small Happiness for Older Adults

The subjects for effect analysis were 327 participants over 60 years of age whose pre- and post- service effects were comparable. Analysis of the results found that after comparing before and after, happiness significantly increased and loneliness decreased by 95% confidence levels. Compared to the preliminary survey, happiness increased by 7%, and loneliness decreased by 4%. This positive change in psychological well-being was prominent in the digitally marginalized group that responded as not owning computers or smartphones.

Older adults living alone suffer from loneliness due to extended periods of being isolated. AI Care Service contains content such as providing free music, holding emotionally supportive conversation, searching for information, and giving the news. Complex welfare services such as visits from the ICT Care manager and ICT care center's regular contact system are also provided. Therefore, it is thought that AI Care Service contributed to increased happiness and decreased loneliness.

A Positive Change in Attitude toward the Use of Digital Devices



There have also been changes in attitude toward the use of digital devices. Enjoyment through using digital devices has increased while anxiety and fear that they will fail has decreased. The efficacy of handling digital devices has also increased. This reveals the possibility that older adults can utilize digital devices more actively when the ICT infrastructure is in place and there is a digital assistant who can teach how to use it. This has great implications for the establishment of digital related systems and policies in the future.

Care During the Untact Period

AI Care Service was installed sequentially from April to December 2019 by regions and individuals. Older adults used AI speakers in their homes for at least 43 and up to 301 days (227 on average). It was an opportunity to effectively utilize the role of the social safety net in Korea.

Efforts are being made to incorporate AI technology into care services to prepare for an aged society in Korea and around the world. Korea has quickly become an aged society. As it is expected to become a post aged society in 2025, options for care service need to evolve. There are great expectations for AI Care Service to be the first step in preparing for this future.

Joohyun OH Research Professor, Barun ICT Research Center, Yonsei University

Post-COVID 19: Be aware of Personal Data in the Untact Business Era

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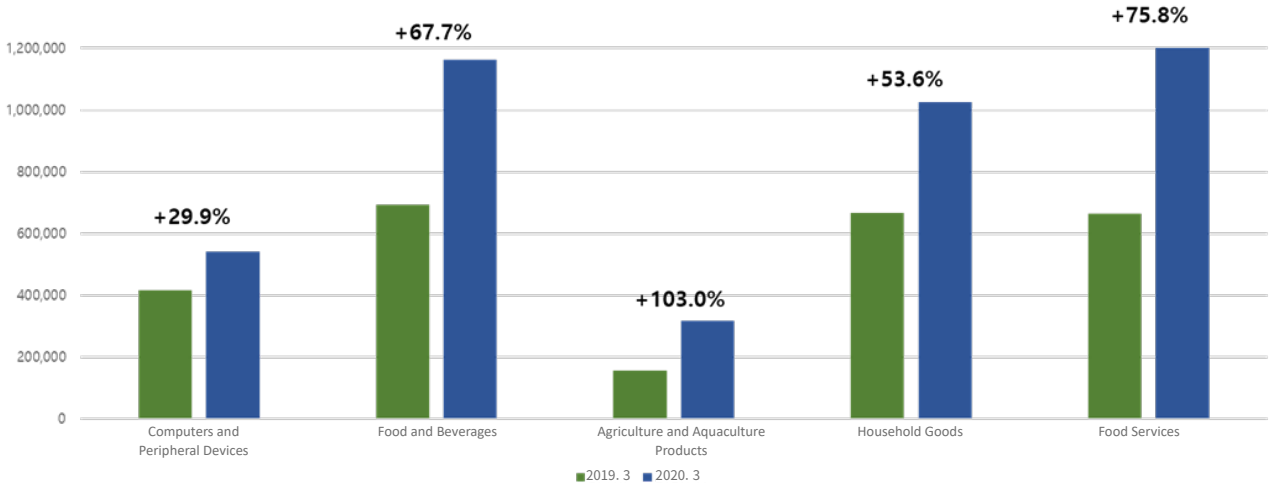
Due to the prolonged effects of Covid-19, our lives are undergoing changes in various aspects such as an increase in telecommuting, online education, and e-commerce every day. In particular, the social distancing policy implemented to prevent the spread has greatly transformed daily life into an untact lifestyle. Both online shopping and OTT services are untact ones that existed before Covid-19, but there is an increased reliance on online shopping to ensure social distancing, and for a while cultural content could be consumed freely through OTT services. As there is more dependency on untact services, the e-commerce market has been showing rapid growth compared to the same period from the previous year.

In particular, as education and work have switched to being online, it was confirmed that the transactions of computers and peripheral devices increased by 29.9% compared to last year. In addition, the explosive growth rate of food and beverages (67.7%), Agriculture and aquaculture products (103.0%), household goods (53.6%), and food services (75.8%) shows the current consumption pattern that solves food through online transactions.

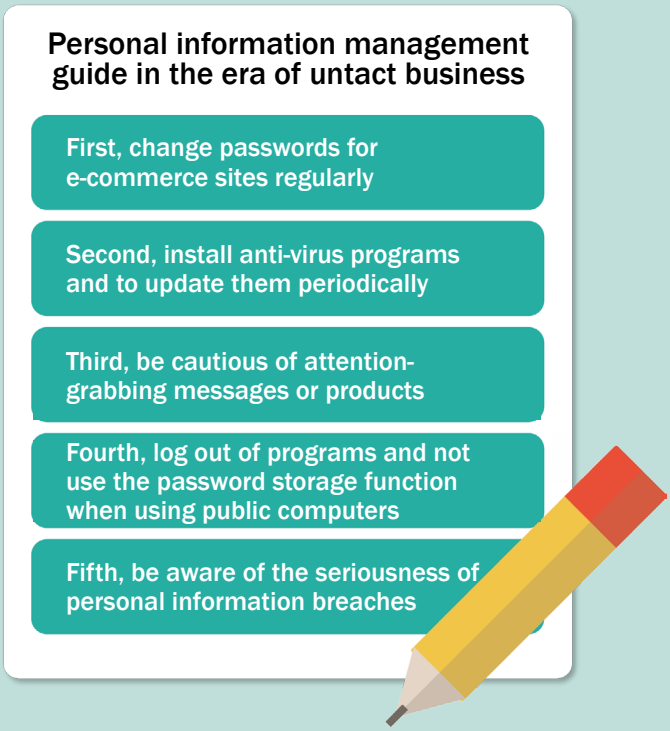


▲ Online transaction growth rate compared to the previous year
(March 2019 before Covid-19 vs. March 2020 after Covid-19 Source: National Statistics Portal)

It is expected that even after the pandemic ends, the untact consumption patterns that have increased will not switch to offline purchases, but rather increase further. Users who entered e-commerce due to strong external factors such as Covid-19 are highly likely to use them continuously; they have already crossed the barriers of entry for online transactions, such as installing apps, creating IDs, and registering payment services, and had begun using online services. In addition, the convenience experienced through online trading will continue to serve as a strong driving force to continue.

People may be indifferent to the management of personal information entered for online transactions. However, in the e-commerce market where a large amount of personal information is being collected, an accident where personal information is breached may be inevitable. This is because the input of personal information for online transactions is essential.

As the number of users increases, weaknesses in personal information management will become apparent, and there is a great possibility that such negligence can lead to major accidents such as credit card personal data breaches. Consumers are paying more attention to personal information management than in the past due to the scandals from large credit card companies in the past - but how should personal information be managed in e-commerce that has become more dominant in a post-Covid-19 world?



Sources: Korea Internet & Security Agency <2019 Personal Information Protection Survey>

First, passwords used for e-commerce sites should be changed regularly. Second, it is important to install anti-virus programs and update them periodically. Third, it is recommended to be cautious of attention-grabbing messages or products related to Covid-19. Fourth, when using a public computer, it is vital to log out of programs and not use the password storage function. However most important is that users themselves should be aware of the seriousness of personal information breach, which should motivate them to make a greater effort to actively carry out the four security measures mentioned above to protect their personal information.

Since Covid-19 is still ongoing, it is more difficult to pay attention to personal information breach accidents because our society as a whole is still unstable. However, companies and users alike need to prepare for better management of personal information during these trying times. If companies and individuals inspect and maintain their personal information management regularly, concerns about large-scale breach may be unfounded.

* This article is contributed by Barun ICT Research Center to SKT Insight

We Need to Stop Worrying about Artificial Intelligence

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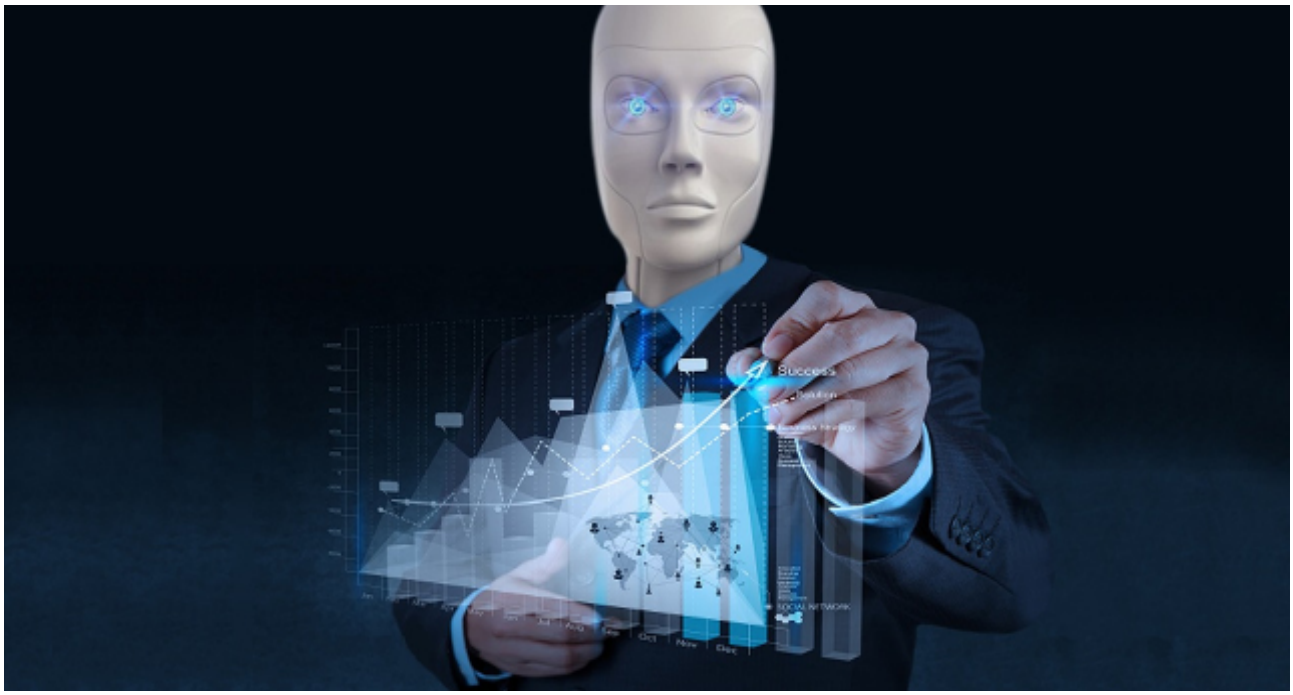

Recently, within only a few years, diverse services utilizing Artificial Intelligence (AI) have appeared in the marketplace. For instance, cars are being tested for feasibility and AI speakers, and SK Telecom's NUGU or Amazon's Alexa are being sold. However, some critics argue that the rapid progress and integration of AI may become a catastrophe for human beings. They propose that soon AI will replace simple jobs and will eventually dominate society by outstripping humans' intelligence through continuously improving via machine learning.

Positive and Negative Opinions about AI

According to a survey by the Gyeongi Research Institute on AI awareness, 62.4 percent of the participants agreed that AI will substantially enhance quality of life. Thus, a majority of people have optimistic views about the conveniences that AI would bring.

On the other hand, when the survey asked about the drawbacks of the technology, 58.1 percent answered that AI would replace many workplaces. Furthermore, the respondents were stressed when considering that it is bound to trigger social chaos later on.

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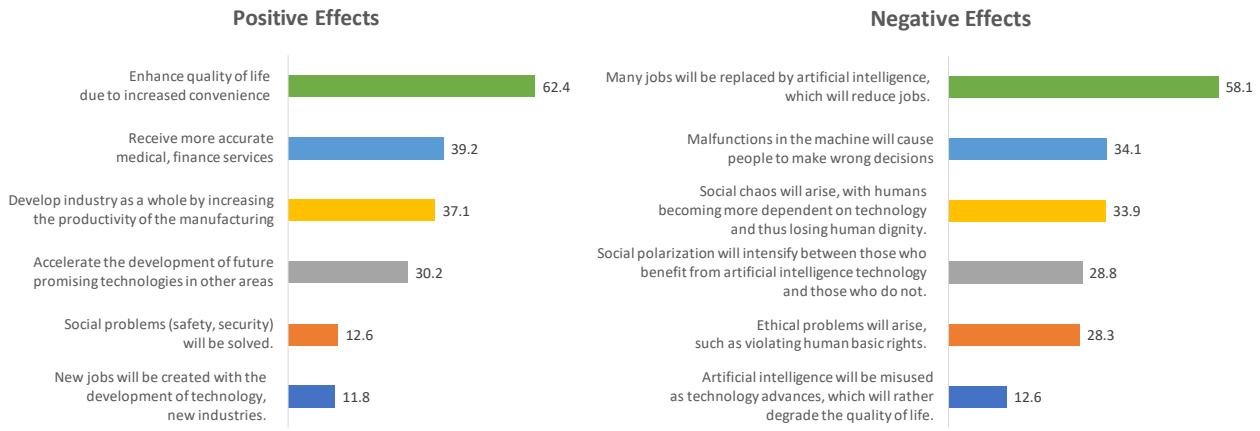
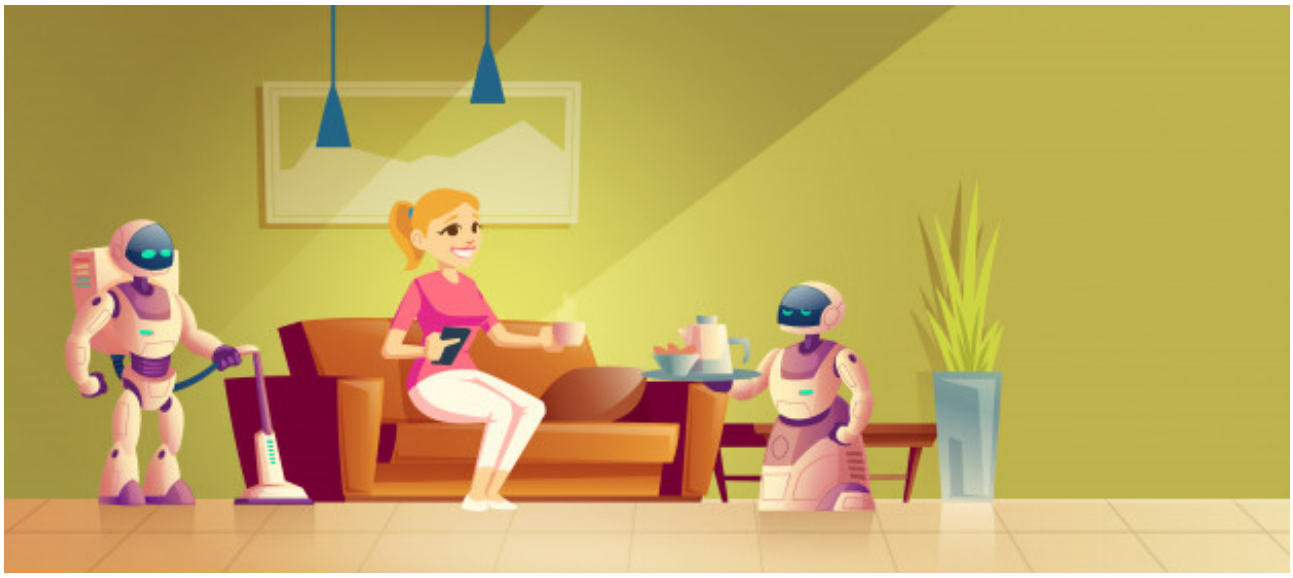


Guidelines and Rules to Prevent AI-related Social Problems

Will such concerns truly emerge in the near future? Fortunately, it is unlikely that such problems would appear due to the numerous endeavors to forestall them. For example, Asilomar AI Principles, established by the Future of Life, a non-profit research organization with Stephen Hawking (Cambridge University Professor) and Elon Musk (Founder of Tesla), and Ethics Guidelines for Trustworthy AI from the EU, as well as the Framework on Ethical Use of AI from Singapore, are all efforts to manage any potential problems.

They are comprised of guidelines and rules in order to prevent the social, moral, and technological issues that may



arise in the coming AI era. For instance, Asilomar AI Principles and the EU's Seven Ethics Guidelines for Trustworthy AI clearly states that the technology should be enhanced only for the benefit of human beings; that is AI should only be used as a tool.

These guidelines are now distributed to every part of the world for its sustainable development. Furthermore, studies about how to follow these rules are being continuously implemented. With that current context in mind, what about managing our concerns and imagining how much utility it would bring to our lives?

Looking at Social Trust through the Lens of the Covid-19 Pandemic

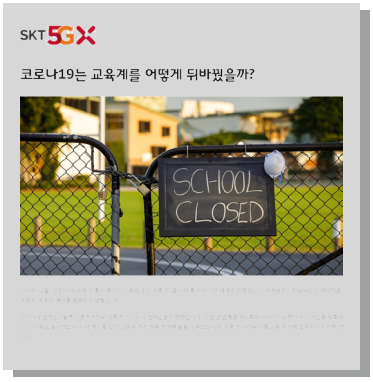
[SKT Insight SKT 5GX ICT Column, **Yonsei University Barun ICT Research Center**] 20.05.04

If we can manage anxiety towards new infectious diseases, not only at the individual level but at the social system level as a whole, we will be able to deal with many problems caused by anxiety in advance. Uncertainty is the single biggest driver of anxiety about new infectious diseases. Therefore, if there is an accurate information-providing system that can reduce such uncertainty, anxiety can be diminished. Currently South Korea's Central Disaster and Safety Countermeasure Headquarters (CDSCHQ) publishes the daily status of infectious diseases (number of new and active cases, those in quarantine, progress of examination, number of deaths), and sends emergency text message information about infected persons and their travel based on their location information from mobile carrier companies. As such, establishing transparent information disclosure with ICT has prevented the spread of infection and built trust on the responses towards Covid-19. On the other hand, in Korea, the hoarding of daily necessities that has spread all over the world was avoided. It is interpreted that people are relieved after learning that they can always purchase necessary items when they need to. Such repetition of positive experiences operates as an availability heuristic that helps us make intuitive decisions. New types of infectious diseases can always occur in the future. In such situations, social trust is expected to act as strong immunity to a viral crisis that may occur at any time. Of course, trust needs to be formed with a highly reliable ICT system through which information can be continuously provided.

Sources: https://www.sktinsight.com/122152

How did Covid-19 Change the Education System?

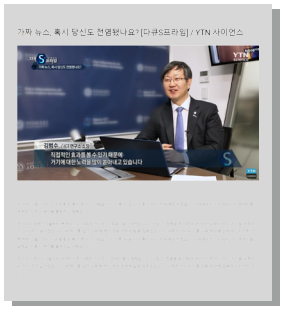
[SKT Insight SKT 5GX ICT Column, **Yonsei University Barun ICT Research Center**] 20.05.14



The Korean government has launched a full-fledged social distancing campaign since March. The educational community that is facing the new semester has also adopted the government policies and has begun to incorporate social distancing measures into the educational sites. Distance learning using online tools is being conducted. With this development a dramatic change in the platforms from the offline to online distance learning based on ICT has successfully been made. The first institutions that incorporated distance learning methods were domestic universities that improved online lecture systems to stabilize distance learning methods. From April, online distance learning has been applied in elementary, middle and high school environments. In the meantime people discovered weaknesses and worked to seek a solution. Ultimately, it is necessary to build a server environment that operates smoothly even with a large amount of connection traffic. Fortunately, carriers such as SKT, cloud companies, and IT are currently cooperating to successfully apply ICT infrastructure technology to educational settings. The online distance learning that began with Covid-19 may have triggered the monitoring of the level of distance education system in Korea. With the steady complement of systems, online distance learning is expected to grow into a new growth industry. If we develop solutions to improve problematic issues and study the positive effects of online education steadily, our current experience will become a great educational asset.

Sources: https://www.sktinsight.com/122456

"Fake News, Have You Been Infected Too?" [YTN Science Documentary S Prime] 20.05.07



Currently people create tremendous amounts of information via the Internet and social media. As such information is being spread rapidly, its ripple effect is also very large. In the context of the new infectious disease, people are motivated to resolve their uncertainty and tend to believe even false information to relieve their anxiety. How is fake news that may cause serious infodemics (the phenomenon of spreading of false information through media) created and propagated? In an effort to create a healthy ICT culture, the Barun ICT Research Center has created guidebooks on the terms that often appear in fake news. After collecting texts that contain false information, we used a word cloud method to visualize keywords in the document and reveal those that appeared most often. It was found that abstract expressions such as "experts", "revealed", "announced", "according to" and "conveyed" were mainly used. In addition, it was confirmed that expressions that lead people to act in a certain way frequently appeared in fake news. The spreaders of fake news used these words with specific links to make readers access the website for various purposes like hacking. Senior citizens, who have difficulties in identifying fake news, are more likely to be exposed to malware and fraud. Fake news is becoming more sophisticated, with only some content from the factual material being manipulated. As such, special attention towards fake news is necessary.

Sources: https://www.youtube.com/watch?v=Gg7j2XNFPec

Mental Health Care and Reduced Loneliness for Older Adults Living Alone... "Talk Talk" becoming a Social Safety Net [Digital Times] 20.05.20

SK Telecom is providing their Happiness Community AI Care service to 15 Korean local authorities. Together with the Barun ICT Research Center they held an online meeting on the 20th to announce the results of the first anniversary of the launch of services and their achievements. AI care services that utilize SK Telecom's NUGU AI speaker is found to be playing a role in preventing lonely deaths and relieving isolation among senior citizens who live alone. In addition to taking care of emotional stability, emergency SOS through AI speakers led to 23 rescue cases through 119 emergency response dispatch for seniors who faced breathing difficulties and high blood pressure. The Barun ICT Center conducted an in-depth survey of 670 elderly people living alone from April 2019 to February 2020. It found that more than 95 percent of elderly people living alone used AI speakers more than three times a week, including 73.6 percent who said they use AI speakers every day. Meanwhile, the survey found that the level of happiness among those surveyed increased by 7 percent compared to before, while the level of loneliness decreased by 4 percent. "AI care can form an emotional bond with older adults, supplement the family gap and reduce loneliness, and ultimately lead to improving the quality of life for older adults," said Kim Bum-soo, executive director of the Barun ICT Center.

Sources: http://www.dt.co.kr/contents.html?article_no=2020052102150931032001

Online Articles 120 Cases Publication

Weekly "Newspaper" 15 Cases Publication

References: http://barunict.kr/

Dealing with Digital Sex Crimes

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Sex crimes have evolved to be more and more malicious online. The “Nth room” case in particular, a large-scale digital sex crime spread by online messenger apps such as Telegram and Wickr, terrified the public as the majority of victims were underaged. Likewise, the number of criminals making and distributing sexually exploitative videos via untraceable platforms or deepfake technology has increased, resulting in public outcry for heavier sentences for digital sex crimes. Furthermore, according to Deeptrace, a cyber security research company in the Netherlands, 96% of deepfake videos were created for pornography. Among the total victims, 25% were Korean women celebrities, being the second highest below the US (41%), which was first [1].

Unlike analog content, digital material blurs the boundaries between original and copied work. Consequently it can be infinitely reproduced, making it nearly impossible to delete completely; illegal sexual exploitation videos often cannot be perfectly eliminated. According to the National Assembly Research Service, the number of cases, where digital sex crime-related information was deleted through self-regulation increased 23.1% from 7,173 in 2018 to 11,119 in 2019 [2]. As a result, ICT is crucial to combat the annually increasing numbers of digital sex crimes. For instance, whenever sex crime material is uploaded online, AI technology can delete it immediately, preventing further distribution.

Moreover in 2017, NAVER invented the X-eye that filters pornography. This technology breaks down images and videos into small parts to evaluate. Through this process, the AI learns the features of pornographic material and rates the level of how much the subject matter resembles illicit content. Based on the evaluation, it determines whether the material should be eliminated or not [3]. The government has also announced that it would soon be using sophisticated AI technology to monitor illegal sexual information and quickly delete it [4].

On the other hand, since digital sex crimes mostly utilize foreign platforms, using technology to eradicate them via filters can be difficult. Rather, to render a much more fundamental change, education on illegal pornography and sexually exploited sources should be conducted at home and in schools. For instance, sex education and tutoring programs on adequate media usage would make individuals learn the attributes of media as well as the negative effects when abused. As a result, they would gain the ability to evaluate and criticize inappropriate content [5].

With the passage of the Act on the Prevention of Nth Room at the Cabinet meeting of the presidential office on May 12th, any future possession, purchase, storage, or viewing of illegal sexual footage will result in up to three years in prison or a fine of up to KRW 30 million [6]. Since it is now possible to punish those who view illegal sexual pictures or videos, individual choices on how to deal with illegal pornography is likely to be more crucial; digital education is compulsory in order to prevent another incident like the Nth room. In addition, diverse institutions such as the government, firms, and schools should consider such issues and cooperate in drafting effective plans for digital sex crime extermination.

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Image Sources: freepik

In the Era of AI Creativity, Can We Protect Copyright?

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A ruling recognizing the copyright of an AI-generated work was finalized for the first time in China this January [1]. Tencent Tech, the plaintiff, had published an article on the stock market written by Dreamwriter, an AI program that collects, analyzes, and evaluates data. Later on, Shanghai Yingmou Technology, the defendant, also posted the exact same article to their website, resulting in Tencent Tech filing a lawsuit against the company. The court analyzed the article and concluded that it displayed much of the uniqueness of the program. Consequently, the AI's creativity was recognized. Considering this development - is it possible to recognize and protect the copyright of AI?

Although AI is not a human being, it replicates abilities such as learning, reasoning, judging, language, and understanding skills via computer programing [2]. Moreover, the technology has continuously been developing to the stage where it now resembles and even outstrips humans in creative work. As a result, art pieces, once regarded as the domain of humans, is now being intruded upon by AI technology, and the issue of copyright continues to be controversial.

In Japan, a novel written by AI surprisingly managed to make it through the first round of screening of the Hoshi Shinichi Literary Awards [3]. Currently the copyrights for AI-made work are not accepted in Japan by law. Nevertheless, the proliferation of AI creations has driven the country's government to form a Next Generation Intellectual Property Review Board, composed of jurists, novelists, and artists. Furthermore, South Korea's legal system lacks a way to determine AI copyright since only human beings are currently eligible for intellectual property rights. However, the government is aiming to establish a legal basis for such issues by next year. This seems to be part of the plan to foster new AI-related businesses by promoting its usage in various fields [4].

On the other hand, there are clear obstacles. If AI copyright is acknowledged, recognition of human artists would become vulnerable. However considering the rulings in China, the development of AI-generated creative work is expected to flourish, leading to an inevitable paradigm shift [1]. Besides literacy, AI seems to show great potential in music and art as well. As a result, laws concerning these works should be meticulous and detailed. Indeed, if copyright protection is feasible, the development and distribution of the art industry will bring about cultural diversity.

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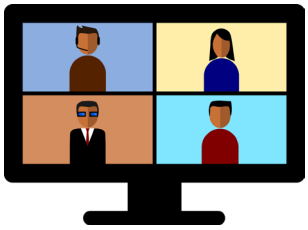
Image Sources: freepik

Untact – A New Cultural Landscape due to Covid-19



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Because of the extended period that Covid-19 is proving to be a threat, “untact”, or non-face-to-face contact, has created a new cultural landscape in our daily lives. Although industries are continuously suffering from the pandemic, there are also cases of companies generating new vehicles for profit, one of which is the chatbot industry. AI-based chatbots are widely used in private companies and in the public domain. Due to the pandemic, the public sector has begun to adopt this untact chatbot option [1]. It is also being used in educational institutions, metropolitan and provincial offices, and the healthcare sector. After asking the patient for symptoms and risk factors, the chatbot determines whether they will visit the emergency room, undergo self-isolation, or receive telemedicine [2]. Previously, chatbots handled only basic tasks because it had problems with ambiguous questions or those with more than one answer. However, this has since been improved, leading to chatbots being available for various work [3].

There is another area that stands out when considering “untact society”: the online payment market. In the aftermath of Covid-19, the amount of transactions done through online payments surged due to the rapid increase in untact consumption such as online shopping. According to the industry, Naver Pay, Kakao Pay, and NHN Payco's transaction volume in the first quarter increased by 31% to 46% compared to the previous year. This is due to fewer outings due to social distancing and increased untact transactions such as online shopping [4]. Naver Pay and Kakao Pay have the benefit of easily attracting existing customers to their site and messenger app as a simple payment platform.

Drones and robots have become more accepted in our lives. As the number of people returning to their communities after lockdown increased as the world's containment measures were eased, drones and robots were mobilized to help governments comply with social distancing. When people gather too closely, drones are used to broadcast a warning, and robotic dogs keep pace with runners and advise them to keep social distance [5]. These drones and robots use AI technology. It is equipped with a function that analyzes the physical distance between people within a certain radius. In this way, the police or public officials can ensure social distancing without face-to-face contact.

This technology is not merely a temporary measure. In the future, it will have a long-term position in our society and become a new way of life. In order for the technology to be established, it is necessary to make sure that it is stable. Recently, there was controversy around the British police capturing footage of a person exercising in the park and uploading it on social media. In this way, separate from the purpose of enforcing social distancing, drones may be used maliciously to monitor individuals. In addition, problems such as data collection without consent, lack of personal information protection devices, and avoidance of taxes through simple payments suggest that there are still issues to be solved in order for untact technology to be properly integrated into our society.

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Who Needs Cash Anymore? Welcome to the Era of Digital Currency

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Some of this century's technological innovations are tools that make life easier. Currently, almost everything can be done online using our mobile phones: shopping, paying bills, reserving tickets, rent, taxes, etc. Things have become easier nowadays, as we don't have to go in person to pay government fees or wait for a long time to pay for services - we can do it in the comfort of our homes.

During crises like what our world is experiencing now the need for digital transactions is increasing to assist with providing food and medical products or communicating with family and the world while in lockdown. Fundraising for crises such as Covid-19 and humanitarian aid, while decreasing human-human interactions, also lowers the possibility for the virus to spread, and is one of the most recent examples of digital transactions. Countries who are leading in services online are increasing day by day, and covering almost all the needs of daily life [1].

Libra is a blockchain digital currency proposed by the American social media company Facebook. The currency and network do not yet exist, and only rudimentary experimental code has been released in 2020 through digital wallets [2]. Compared to Bitcoin, Facebook Libra uses various international currencies that stabilizes and prevents swings of Libra's value. Facebook also aims to support Libra with individual stable coins of real-world currencies, such as British pound and U.S. dollar. On the other hand, Bitcoin lacks back-up coins other than the amount that people are willing to pay for it. This is the reason that Bitcoin suffers from huge swings in value.

T-money or digital currency holds great expectations and opportunities to be incorporated into all aspects of everyday life, with a high level of privacy and safety and a limited number of downsides.

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A Growing Educational Gap in A Digital World

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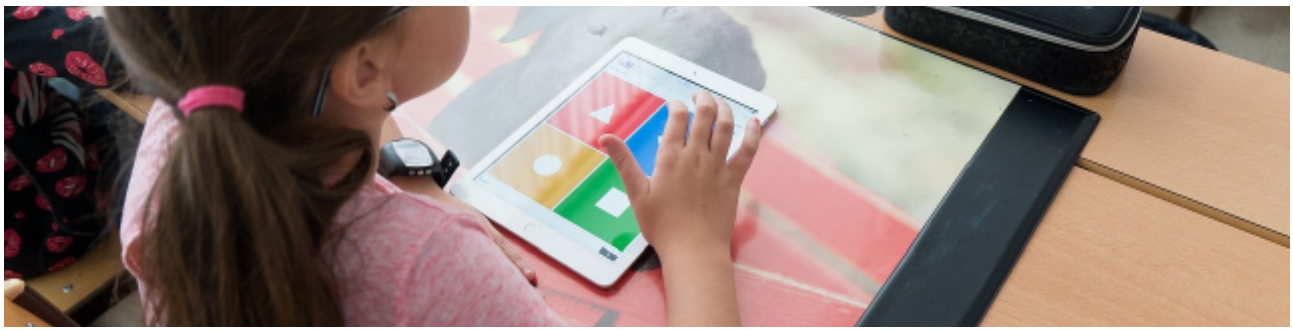

As Covid-19 rampages across the globe, the majority of schools and educational institutions worldwide have shifted into a complete digital teaching method - a type of learning that makes effective use of technology as a measure to reduce the spread of the virus especially among the young population. However, sometimes we forget that having full access to distance learning may be a privilege that is not guaranteed everywhere, whether it be children living in remote areas or those under financial constraints.

One of the contributors to the education gap is the lack of resources in low-income households. According to data from the 2015 Census Bureau, about 15 percent of U.S. households with school-aged children do not have a high-speed internet connection at home. The chaotic situation under the spread of Coronavirus has further limited the available resources for people in poverty and has thus expanded the scale of uneven distribution of education across urban, rural, and remote areas.

There is also a group of children in China falling behind in digital learning for a different reason. Children of migrant parents who leave to work in urban areas in China are often called “left-behind children” or the “stay-at-home children”. Not only do they not have any resources to access electronic devices, they are also not properly educated or supervised as most of the left-behind children are raised by grandparents who are also computer-illiterate.

The widening digital learning gap has caught the attention of many governments and caused them to take different measures. The Chinese local government has encouraged starting all-day TV broadcasts of various lessons in math, English, art, and physical education so that the 60 million left-behind children could receive basic education without having a computer or smartphone at home. Several companies in the U.S. have signed on to the FCC’s Keep Americans Connected pledge as a measure to waive late fees and to refrain from terminating digital service for households unable to pay back the monthly bills; New York city’s department of education is planning to lend 300,000 iPads to students who are unable to practice remote learning on their own. Free Wi-fi hot spots are also provided for low-income households in certain regions.

However, those measures can only help a portion, but not all children suffering from the lack of resources and facilities. Even before the start of the pandemic, imbalanced learning opportunities have negatively affected thousands of students worldwide, and the recent shutdown of schools and transition into a complete distance learning system have exacerbated the difference. The increasing learning gap under the digitalized education system is a long-term issue that needs to be tackled with consistent effort and effective policies.

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Internet Speeds amidst the Covid-19 Pandemic

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The Covid-19 pandemic has now reached every country except those where the government has not reported any cases. Since the beginning in late 2019, nationwide and regional lockdowns have been implemented in different parts of the world. Consequently, people have been forced to work from home and spend most of their time using online internet services. However, reports show that internet speeds were negatively affected due to surges in traffic.

Image Sources: freepik

According to an investigation conducted by engineers at Fastly, massive increases in traffic volume following quarantine resulted in a lower internet quality over the months of February and March [1]. In Italy, the overall internet traffic was reported to have increased by 109.2% while the download speed deteriorated by 35.4%. Countries hit heavily by the outbreak, such as France, the United Kingdom, and Spain, showed an increase in traffic by 38.4%, 78.6%, and 39.5%, respectively. The corresponding decreases in download speed for these countries were 13.9%, 30.3%, and 8.0%, respectively.

Despite the overall drop in internet quality in the worst-hit regions, companies that use the internet to provide the majority of their services have implemented countermeasures to help stabilize the effects of the traffic surge. Companies such as Dropbox and Netflix have started to use extra servers in their operations [2]. Many large companies that rely on cloud services provided by platforms such as Google Cloud and Amazon Web Services have begun to migrate cloud-based operations to their own datacenters.

Even though quarantine measures in different parts of the world have slowed down the internet locally, studies show that most countries' internet infrastructures can handle the surge in traffic without totally breaking down [3]. The pandemic has sent a warning message to some companies to build more robust and dependable services that can work seamlessly amidst unexpected traffic spikes. Despite all the negative consequences the pandemic has brought, it is arguably paving the way for a major upgrade in the internet services we use every day.

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Zero-contact Care System for Covid-19 Patients in Taiwan

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Image Sources: freepik

Contagious diseases such as Covid-19 have caused deaths among health care workers, including doctors, nurses, and volunteers. In order to care for the patients, health care personnel have no choice but to expose themselves to the virus. The Industrial Technology Research Institute (ITRI) and Taipei Medical University Hospital (TMUH) have developed a new system consisting of artificial intelligence algorithms and infrared sensors [1]. Cheng Jen-Chieh, director of ITRI's Service Systems Technology Center, explained that the AI system can collect patient data, such as body temperature, heart and respiratory rate. Healthcare workers will have access to patient information without having to come into close contact with them, lowering the risk of exposure. Moreover, patients will have access to their health data on their smartphone app. Medical professionals in hospitals can also conduct video conference calls with patients for consultations [1]. According to ITRI Executive Vice President Chang Pei-Zen, this contact-free system will increase efficiency as well, since the healthcare workers do not have to wear protective gear, eliminating the process of getting dressed that takes around 20 minutes.

However, this newly implemented system still has its limitations. There is no certainty that the machine can detect patient abnormalities. Secondly, those in critical condition may have difficulty speaking to the healthcare professionals through video conference calls. Therefore, it is important to thoroughly test the machines to see if there are any errors and to check the accuracy of the data, while also providing close-contact care when needed.

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Publisher Beomsoo Kim | Editor-in-Chief Miyea Kim
Editor Yoonhee Jang | Designer Yeeun Lee
Translator Sojung Yoon, Hyelyong Kim, Sungha Jo, Alexandra Stephenson
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